RCA
Review

A technical journal published quarterly
by RCA Research and Engineering
in cooperation with the subsidiaries
and divisions of RCA.

# Index Volume 35, 1974

## March 1974 Volume 35 Number 1

3 Control of Blooming in Charge-Coupled Imagers
W. F. Kosonocky, J. E. Carnes, M. G. Kovac, P. Levine, F. V. Shallcross, and R. L. Rodgers

25 Intermodulation Distortion in Resistive Mixers
Stewart M. Perlow

48 Review of Gas-Breakdown Phenomena Induced by High Power Lasers
I. P. Shkarofsky

### An Introduction to the Science and Technology of Liquid Crystals

79 Introduction
E. B. Priestly and P. J. Wojtowicz

81 Liquid Crystal Mesophases
E. B. Priestley

94 Structure-Property Relationships in Thermotropic Organic Liquid Crystals
Aaron W. Levine

105 Introduction to the Molecular Theory of Nematic Liquid Crystals
P. J. Wojtowicz

118 Generalized Mean Field Theory of Nematic Liquid Crystals
P. J. Wojtowicz

132 Hard Rod Model of the Nematic-Isotropic Phase Transition
Ping Sheng

144 Nematic Order: The Long Range Orientational Distribution Function
E. B. Priestley

155 Technical Papers

158 Patents

161 Authors

## June 1974 Volume 35 Number 2

167 An Electronic License Plate for Motor Vehicles
Fred Sterzer

176 The Electro-Optic Transfer Function in Nematic Liquids
Alan Sussman

198 Dispersion-Limited Modulation Bandwidths of Optical Fibers
James P. Wittke

216 Design, Construction, and Testing of a Magnetic Bubble Memory Chip
L. S. Onyshkevych, R. Shahbender, S. Tomkiel, and F. Putzrath

234 Properties of Avalanche Photodiodes
P. P. Webb, R. J. McIntyre, and J. Conradi

279 Review on High-Power-Laser Damage to Materials II
A. K. Ghosh

320 Errata Notice

321 Technical Papers

324 Patents

327 Authors

## September 1974 Volume 35 Number 3

333 A. N. Goldsmith—In Memoriam

335 A Facsimile System Using Room-Temperature Injection-Laser Scanning
P. V. Goedertier, I. Gorog, J. D. Knox, I. Ladany, and J. P. Wittke

341 Video Processing in Charge-Transfer Image Sensors by Recycling of Signals Through the Sensor
P. K. Weimer, W. S. Pike, F. V. Shallcross, and M. G. Kovac

355 Low-Loss Broadband Microwave Ultrasonic Delay Lines Using Ion-Beam-Milled Shear-Wave Transducers
David M. Stevenson and J. J. Hanak

372 S-Band Trapatt Amplifiers with Four-Layer Diode Structures
H. Kawamoto, S. G. Liu, H. J. Prager, and E. L. Allen, Jr.

**An Introduction to the Science and Technology of Liquid Crystals—II**

388 Introduction to the Molecular Theory of Smectic-A Liquid Crystals
Peter J. Wojtowicz

408 Introduction to the elastic Continuum Theory of Liquid Crystals
Ping Sheng

433 Electrohydrodynamic Instabilities in Nematic Liquid Crystals
Dietrich Meyerhofer

462 Pressure Effects in Sealed Liquid-Crystal Cells
Richard Williams

447 Liquid-Crystal Displays—Packaging and Surface Treatments
L. A. Goodman

468 Technical Papers

471 Patents

473 Authors

## December 1974 Volume 35 Number 4

483 System for Visualizing and Measuring Ultrasonic Wavefronts
R. S. Mezrich, K. F. Etzold, and D. H. R. Vilkomerson

520 Electronic Processes in Oxide Cathodes
T. N. Chin, R. W. Cohen, and M. D. Coutts

532 A Membrane Page Composer—Further Developments
L. S. Cosentino and W. C. Stewart

567 High-Efficiency GaAs Impatt Structures
L. C. Upadhyayula, S. T. Jolly, H. C. Huang, and B. J. Levin

579 Empirical Relationships Between Thermal Conductivity and Temperature for Silicon and Germanium
A. G. Kokkas

**An Introduction to the Science and Technology of Liquid Crystals—III**

584 Introduction to the Optical Properties of Cholesteric and Chiral Nematic Liquid Crystals
E. B. Priestley

600 Electrochemistry in Nematic Liquid-Crystal Solvents
A. Sussman

613 Liquid-Crystal Displays—Electro-Optic Effects and Addressing Techniques
L. A. Goodman

652 Liquid-Crystal Optical Waveguides
D. J. Channin

667 Lyotropic Liquid Crystals and Biological Membranes: The Crucial Role of Water
P. J. Wojtowicz

685 Technical Papers

688 Patents

690 Authors

697 Index to Vol. 35, 1974

# Index to Authors, Volume 35, 1974

**E. L. Allen** S-Band Trapatt Amplifiers with Four-Layer Diode Structures, September, p. 372

**J. E. Carnes** Control of Blooming in Charge-Coupled Imagers, March, p. 3

**D. J. Channin** Liquid-Crystal Optical Waveguides, December, p. 652

**T. N. Chin** Electronic Processes in Oxide Cathodes, December, p. 520

**R. W. Cohen** Electronic Processes in Oxide Cathodes, December, p. 520

**J. Conradi** Properties of Avalanche Photodiodes, June, p. 234

**L. S. Cosentino** A Membrane Page Composer—Further Developments, December, p. 532

**M. D. Coutts** Electronic Processes in Oxide Cathodes, December, p. 520

**K. F. Etzold** System for Visualizing and Measuring Ultrasonic Wavefronts, December, p. 483

**A. K. Ghosh** Review on High-Power-Laser Damage to Materials IIn June, p. 279

**P. V. Goedertier** A Facsimile System Using Room-Temperature Injection-Laser Scanning, September, p. 335

**L. A. Goodman** Liquid-Crystal Displays—Packaging and Surface Treatments, September, p. 447

—Liquid-Crystal Displays—Electro-Optic Effects and Addressing Techniques, December, p. 613

**I. Gorog** A Facsimile System Using Room-Temperature Injection-Laser Scanning, September, p. 335

**J. J. Hanak** Low-Loss Broadband Microwave Ultrasonic Delay Lines Using Ion-Beam-Milled Shear-Wave Transducers, September, p. 355

**H. C. Huang** High-Efficiency GaAs Impatt Structures, December, p. 567

**S. T. Jolly** High-Efficiency GaAs Impatt Structures, December, p. 567

**H. Kawamoto** S-Band Trapatt Amplifiers with Four-Layer Diode Structures, September, p. 372

**J. D. Knox** A Facsimile System Using Room-Temperature Injection-Laser Scanning, September, p. 335

**A. G. Kokkas** Empirical Relationships Between Thermal Conductivity and Temperature for Silicon and Germanium, December, p. 579

**W. F. Kosonocky** Control of Blooming in Charge-Coupled Imagers, March, p. 3

**M. G. Kovac** Control of Blooming in Charge-Coupled Imagers, March, p. 3

—Video Processing in Charge-Transfer Image Sensors by Recycling of Signals Through the Sensor, September, p. 341

**I. Ladany** A Facsimile System Using Room-Temperature Injection-Laser Scanning, September, p. 335

**P. Levine** Control of Blooming in Charge-Coupled Imagers, March, p. 3

**A. W. Levine** Structure-Property Relationships in Thermotropic Organic Liquid Crystals, March, p. 94

**S. G. Liu** S-Band Trapatt Amplifiers with Four-Layer Diode Structures, September, p. 372

**R. J. McIntyre** Properties of Avalanche Photodiodes, June, p. 234

**D. Meyerhofer** Electrohydrodynamic Instabilities in Nematic Liquid Crystals, September, p. 433

**R. S. Mezrich** System for Visualizing and Measuring Ultrasonic Wavefronts, December, p. 483

**L. S. Onyshkevych** Design, Construction and Testing of a Magnetic Bubble Memory Chip, June, p. 216

**S. M. Perlow** Intermodulation Distortion in Resistive Mixers, March, p. 25

**W. S. Pike** Video Processing in Charge-Transfer Image Sensors by Recycling of Signals Through the Sensor, September, p. 341

**H. J. Prager** S-Band Trapatt Amplifiers with Four-Layer Diode Structures, September, p. 372

**E. B. Priestley** Introduction to the Science and Technology of Liquid Crystals, March, p. 79

—Liquid Crystal Mesophases, March, p. 81

—Nematic Order: The Long Range Orientational Distribution Function, March, p. 144

—Introduction to the Optical Properties of Cholesteric and Chiral Nematic Liquid Crystals, December, p. 584

**F. Putzrath** Design, Construction, and Testing of a Magnetic Bubble Memory Chip, June, p. 216

**R. L. Rodgers** Control of Blooming in Charge-Coupled Imagers, March, p. 3

**R. Shahbender** Design, Construction, and Testing of a Magnetic Bubble Memory Chip, June, p. 216

**F. V. Shallcross** Control of Blooming in Charge-Coupled Imagers, March, p. 3

—Video Processing in Charge-Transfer Image Sensors by Recycling of Signals Through the Sensor, September, p. 341

**P. Sheng** Hard Rod Model of the Nematic-Isotropic Phase Transition, March, p. 132

—Introduction to the Elastic Continuum Theory of Liquid Crystals, September, p. 408

**I. P. Shkarofsky** Review of Gas-Breakdown Phenomena Induced by High Power Lasers, March, p. 48
**F. Sterzer** An Electronic License Plate for Motor Vehicles, June, p. 167
**D. M. Stevenson** Low-Loss Broadband Microwave Ultrasonic Delay Lines Using Ion-Beam-Milled Shear-Wave Transducers, September, p. 355
**W. C. Stewart** A Membrane Page Composer—Further Developments, December, p. 532
**A. Sussman** The Electro-Optic Transfer Function in Nematic Liquids, June, p. 176
—Electrochemistry in Nematic Liquid-Crystal Solvents, December, p. 600
**S. Tomkiel** Design, Construction, and Testing of a Magnetic Bubble Memory Chip, June, p. 216
**L. C. Upadhyayula** High-Efficiency GaAs Impatt Structures, December, p. 567
**D. H. R. Vilkomerson** System for Visualizing and Measuring Ultrasonic Wavefronts, December, p. 483
**P. P. Webb** Properties of Avalanche Photodiodes, June, p. 234
**P. K. Weimer** Video Processing in Charge-Transfer Image Sensors by Recycling of Signals Through the Sensor, September, p. 341
**R. Williams** Pressure Effects in Sealed Liquid-Crystal Cells, September, p. 462
**J. P. Wittke** Dispersion-Limited Modulation Bandwidths of Optical Fibers, June, p. 198
—A Facsimile System Using Room-Temperature Injection-Laser Scanning, September, p. 335
**P. J. Wojtowicz** Introduction to the Science and Technology of Liquid Crystals, March, p. 79
—Introduction to the Molecular Theory of Nematic Liquid Crystals, March, p. 105
—Generalized Mean Field Theory of Nematic Liquid Crystals, March, p. 118
—Introduction to the Molecular Theory of Smectic-A Liquid Crystals, September, p. 388
—Lyotropic Liquid Crystals and Biological Membranes: The Crucial Role of Water, December, p. 667